

pH / Redox Measurement mycom CPM 152

pH and Redox Transmitter with Controller and Limit Functions for Ex and Non-Ex Areas



Areas of application

The analytical transmitter Mycom CPM 152 is intended for highly reliable and accurate pH or redox measurement in all areas of process control and engineering.

Modular instrument design and compatibility with a variety of sensors permit optimum adaptation to any measuring and control task.

- Chemical industry
- Foodstuffs industry
- Pharmaceutical industry
- Water conditioning
- Also suitable for Ex areas



Benefits at a glance

- High reliability
 - Automatic buffer detection
 - Sensor check system (SCS)
 - Medium temperature compensation
 - Log function
 - Calibration history
 - Four-wire system
 - Relay outputs for non-Ex version
 - Optocouplers as switching contacts for Ex version
 - Integrated “Chemoclean” cleaning functions
- Modular adaptation
 - pH / redox switchable
 - Individual configuration at factory by plug-in modules
 - Optional two-circuit measurement
 - Numerous controller and limit functions
 - Output contacts according to NAMUR
 - Optional PROFIBUS-PA interface
- EEx em [ia/ib] IIC T4 approval



Endress+Hauser

The Power of Know How

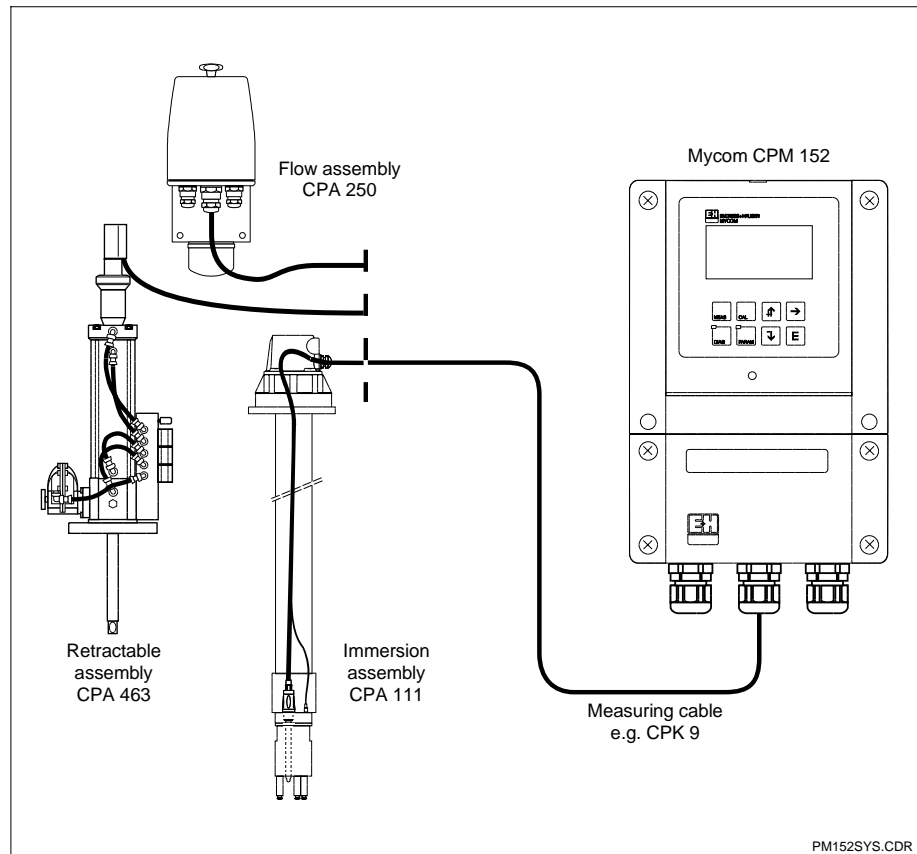


Measuring and control system

A measuring system generally consists of:

- a pH / redox combination electrode with an integrated or separate temperature sensor Pt 100
- an immersion, flow or retractable assembly with or without potential matching pin
- the pH / redox measuring cable, e.g. CPK 9 with TOP 68 connector
- the Mycom CPM 152 measuring transmitter.

Possible measuring system configurations



PM152SYS.CDR

General information

Contacts according to NAMUR

Switching contacts used to output function checking, maintenance and failure messages according to NAMUR (measuring and control engineering standards working group) recommendations.

Simple controller usage

In the basic version, the instrument has two potential-free output contacts (non-Ex: relays, Ex: optocouplers). One serves as a failure contact, the other can be programmed by the user to function as a controller, limit contact or fault signalling contact. By means of an additional plug-in module, the instrument can be equipped with up to five output contacts. The controller can be either defined as a three-point step controller or as a proportional controller with pulse-length or pulse-frequency controller behaviour. Limit functions are also available.

Cleaning contacts

With the contact outputs spray cleaning systems can be controlled. Cleaning can be triggered either automatically via programmed cycles or manually.

The system Chemoclean cleans the electrode automatically. For this system you need a transmitter with an additional module 3 relays/Chemoclean.

All functions of the retractable assemblies CPA 463/463-S and CPA 465 can be controlled with an additional analogue input module and the Autoclean system CPC 20.

Sensor check system (SCS)

Hairline cracks in the pH electrode glass membrane, soiling and blocking of the reference system or mechanical electrode destruction may result in inaccurate measured values. Any of these states will be signalled as an alarm by the continually active sensor check facility.

General information

Accurate calibration and measurement

The instrument supports all commonly used calibration types, including isotherm intersection compensation:

- **Automatic calibration through buffer self-detection**

DIN, Endress+Hauser, Merck and Riedel de Haën / Ingold buffer tables are stored in the instrument. Additional buffer tables can be programmed by the user.

The instrument automatically detects the buffer value during calibration.

- **Manual calibration**

The manual calibration can be performed as a two-point calibration (zero and slope) or as a one-point calibration, i.e. zero or slope calibration of the pH electrode.

- **Numeric calibration (data input)**

The electrode data (zero and slope) is entered via the keypad.

- **Calibration statistics**

The data of the previous five calibrations (including date and time of day) is stored in a list.

- **Medium temperature compensation (alpha value compensation)**

Permits extremely precise measurement even across wide temperature ranges. This type of compensation compensates for temperature influence on the medium.











Sophisticated service and start-up functions

The instrument features numerous useful service functions, such as log, current output simulation, relay switching function simulation and selective instrument checking functions, e.g. keypad, display, RAM test. The user-guided start-up function (setup) allows speedy adjustment of basic functions.

Instrument equipment

The modular design of the CPM 152 measuring transmitter allows optimum adaptation to specific requirements.

- There are maximum 4 module slots available.
- The xxH variants (see product structure) do not have current outputs.

	Basic version	Expansion possibilities/ Additional modules
Measuring inputs	on MODULE:   pH/Redox Temperatur	on MODULE:   pH/Redox Temperatur
Current outputs	on MOTHER BOARD (Non-Ex), resp. on MODULE (Ex):   pH/Redox temperature	
Output contacts	on MOTHER BOARD (Non-Ex: as relays; Ex: as optocouplers):  1x Failure contact, 1x free selectable as: maintenance need or controller or limit value	on MODULE: 3 relays (Non-Ex) resp. optocouplers (Ex): Cleaning / NAMUR and controller contacts  necessary for Chemoclean and for Autoclean (CPC 20)
Analogue / contact input		on MODULE: Feedback/Hold input (active analog input; Hold contacts)   necessary for Autoclean (CPC 20)
Communication		on MODULE: PROFIBUS

Operation

Menu-guided operation

The functions of the Mycom CPM 152 measuring transmitter are arranged in four major groups:

- Parametrisation
- Measurement
- Calibration
- Diagnosis

The PARAM, MEAS, DIAG and CAL keys are used for direct access to the corresponding selection menus. The options available in these menus are shown in plain text. The currently selected items are displayed inverted. Selections are made with the arrow keys which are also used to edit numeric values.

Everything at a glance

The eight-line display has room for auxiliary information:

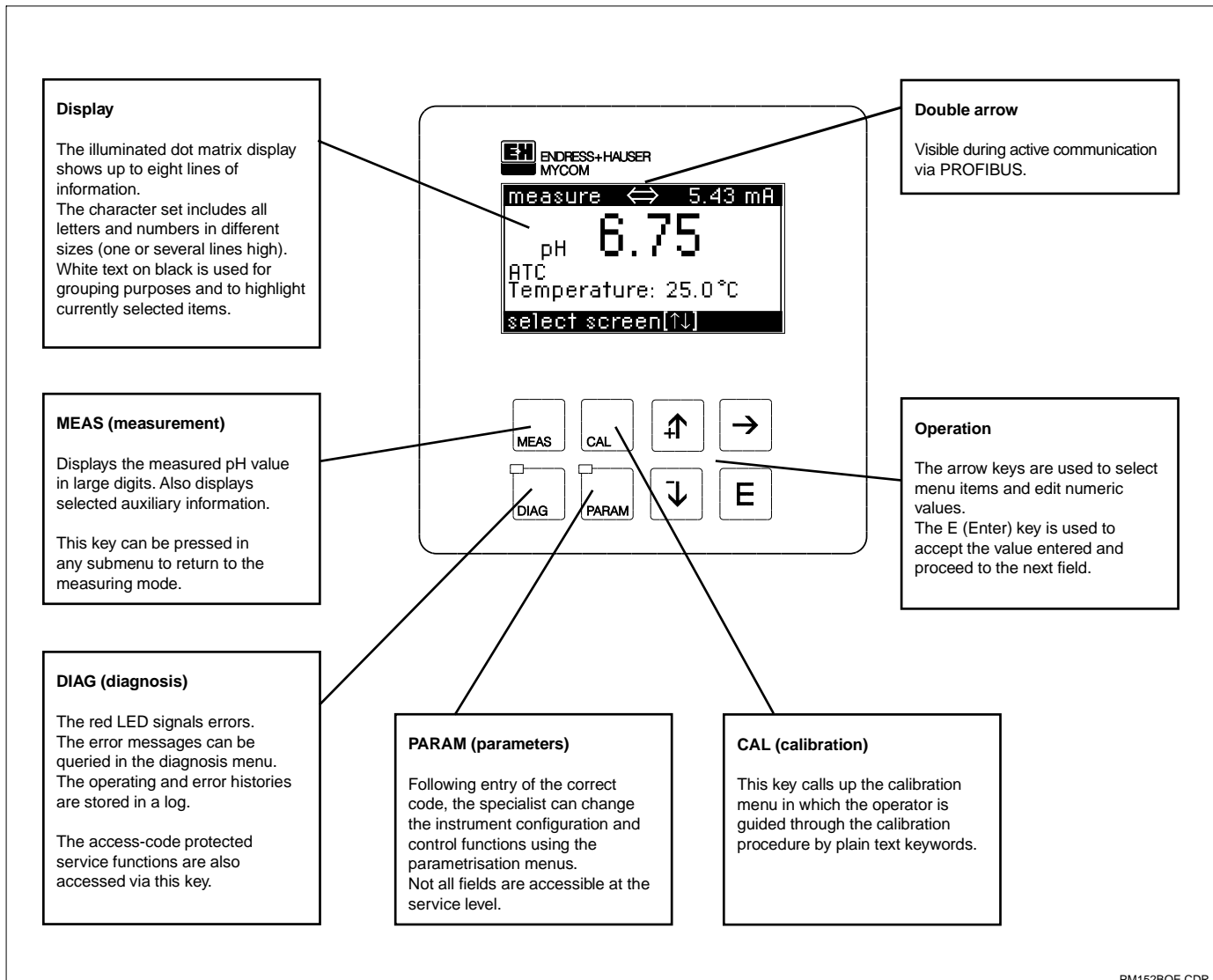
- Auxiliary measured values
- Temperature compensation setting
- Display of operating options
- Permissible range of currently edited value.

No unauthorised access

Configuration and calibration are effectively protected against unwanted changes by means of three access levels.

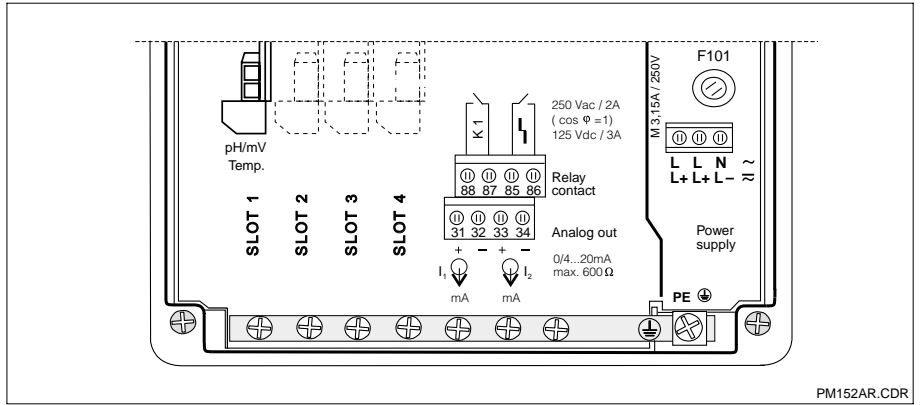
- **No code**
is required for access to:
 - Measurement displays
 - Error list
 - Info list
 - Log
 - Calibration statistics
- **The service code**
is used to access:
 - Short operation menu
 - Calibration functions
 - Temperature compensation
 - Cleaning functions
- **The specialist code**
provides access to all menus and functions.

Display and operating elements of Mycom CPM 152

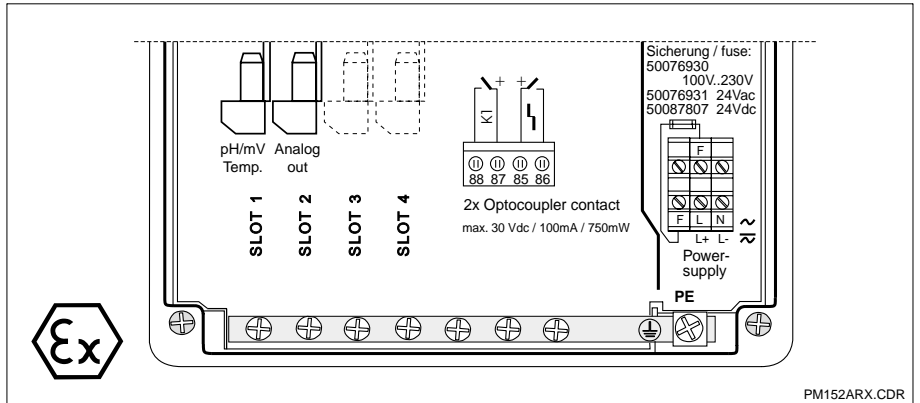


Electrical connection

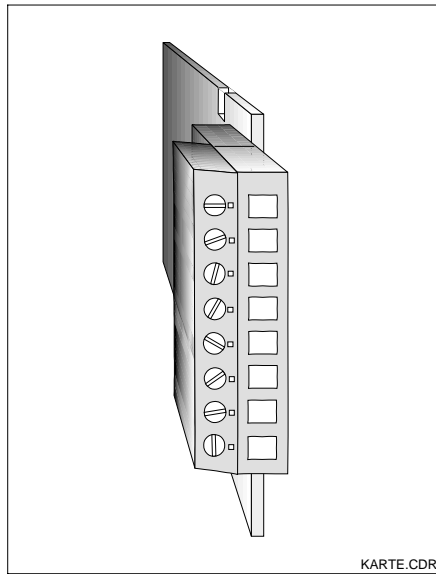
Connection compartment of Mycom CPM 152-A for non-Ex area (basic version)



Connection compartment of Mycom CPM 152-Z for Ex area (basic version)



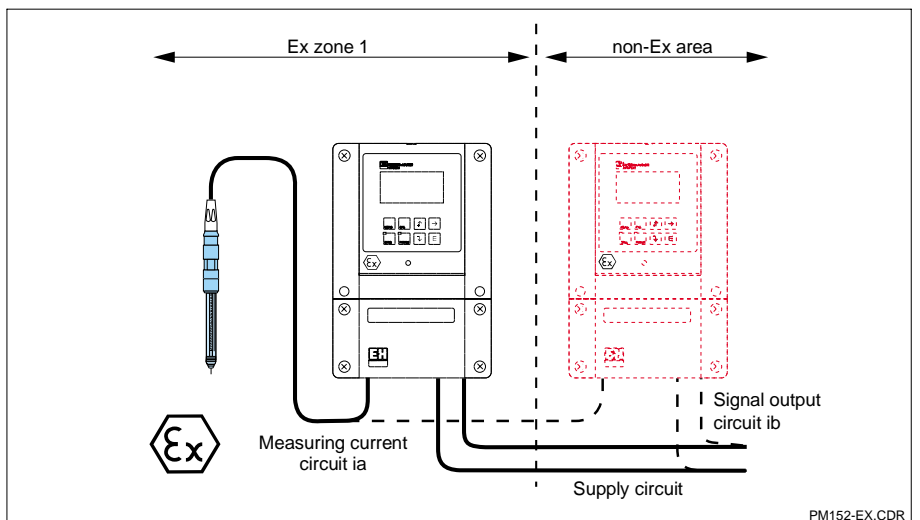
Terminal block of optional modules



The connections are located in the separate connection compartment. This is where the mains input, the signal and contact outputs of the basic assembly and the module for pH / redox measurement are found. This compartment can also hold the plug-in terminal blocks of up to three optional plug-in modules:

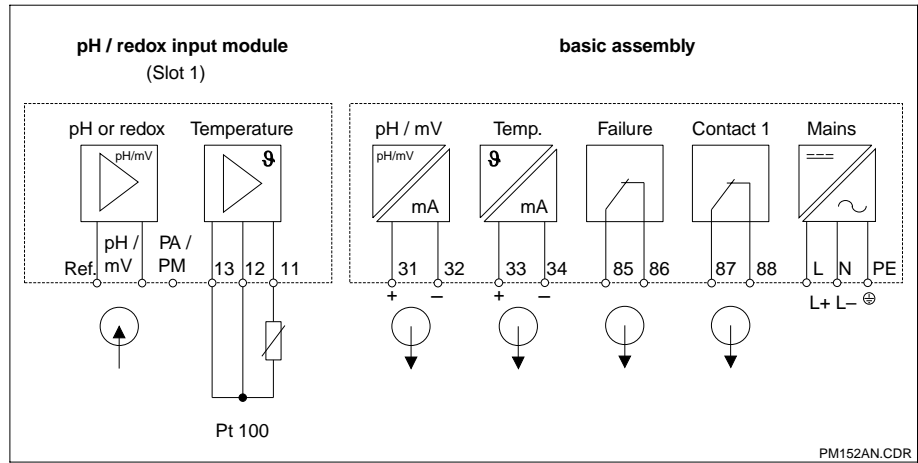
- Second pH / redox input for two-circuit measurement
- Three additional output contacts for controller or Chemoclean functions
- Two binary input contacts (hold) and one active 0 / 4 ... 20 mA current input (supply of Autoclean CPC 20 in Ex version).

Electrode and measuring transmitter in Ex area

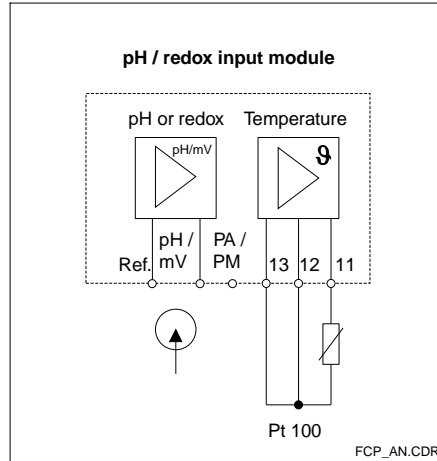


Electrical connection of CPM 152 in non-Ex area

Connection diagram of CPM 152-A (non-Ex), basic version

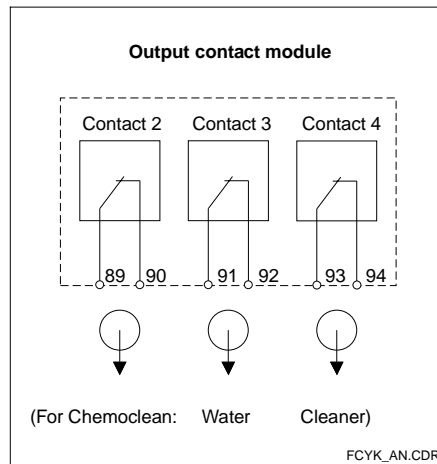


Connection diagram of optional module for two-circuit measurement

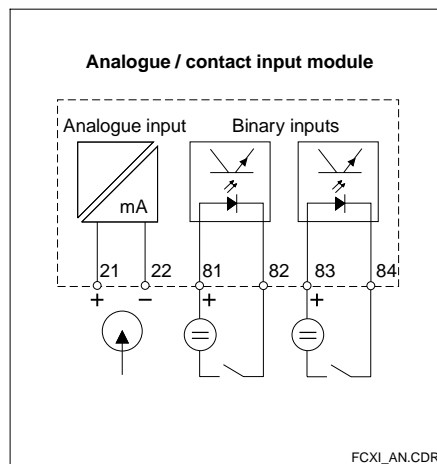


The basic version may be expanded by installing up to three optional modules. These are installed in slots 2 to 4.

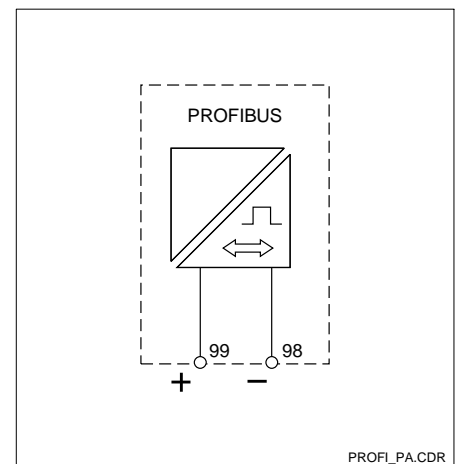
Connection diagram of optional module with three relays for controller or Chemoclean



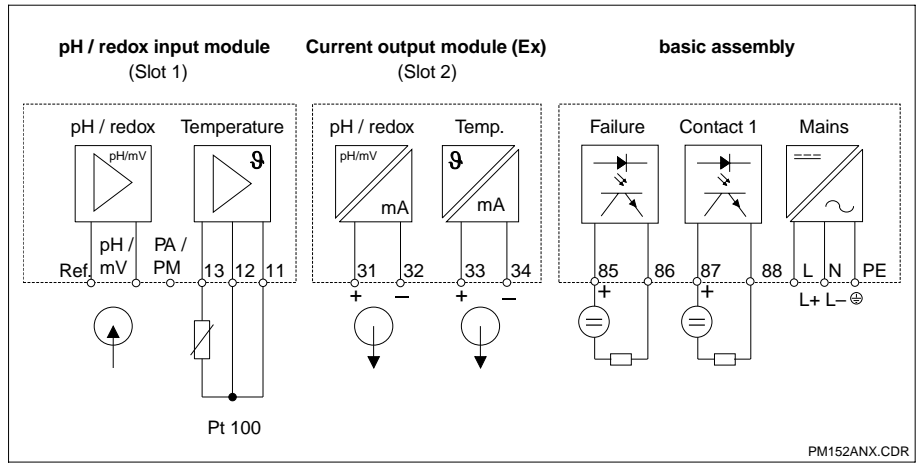
left: Connection diagram of optional module with two binary input contacts (hold) and active analogue input (Autoclean supply)



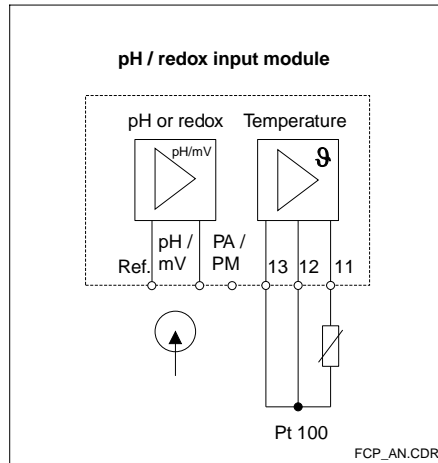
right: Connection diagram of optional module for PROFIBUS-PA



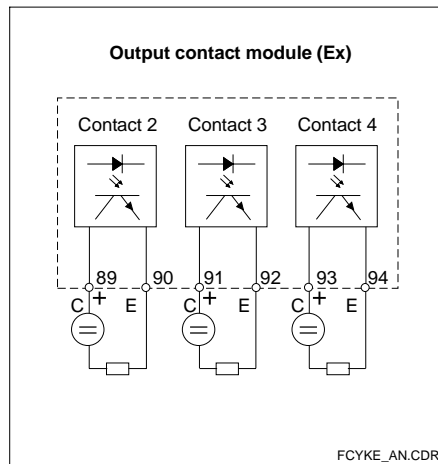
Electrical connection of CPM 152 in Ex area



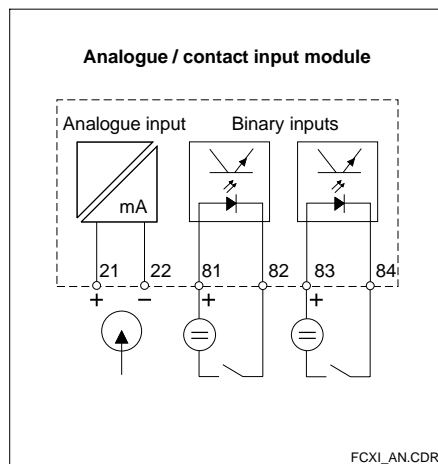
Connection diagram of CPM 152-Z (Ex), basic version



Connection diagram of optional module for two-circuit measurement



Connection diagram of optional module with three optocouplers for controller or Chemoclean



left: Connection diagram of optional module with two binary input contacts (hold) and active analogue input (Autoclean supply)

right: Connection diagram of optional module for PROFIBUS-PA



The Mycom CPM 152-Z has been approved for operation in explosion hazardous areas (EEx em [ia/ib] IIC T4).

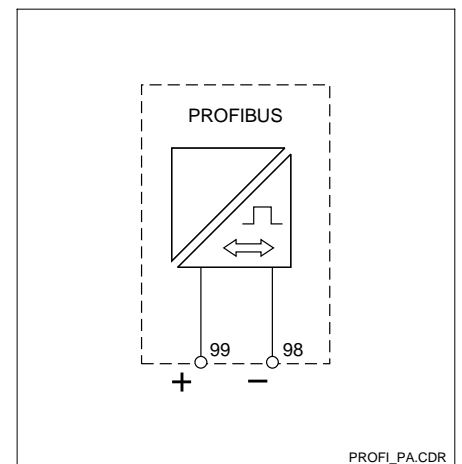
Test certificates: BVS 95.D.2098 and Swiss Electrotechnical Association (SEA) 96.1 10489

The transmitter can be operated in zone 1 or 2. Endress+Hauser pH / redox electrodes can be used in zone 1 without special approval.

basic versions of Ex instruments can be equipped with up to two optional modules.

Please refer to the Endress+Hauser information brochure GI 003/11/en "Explosion protection of electrical equipment and systems" for useful information on installation and operation of electrical equipment in hazardous areas.

This brochure may be ordered from the Endress+Hauser sales centre.

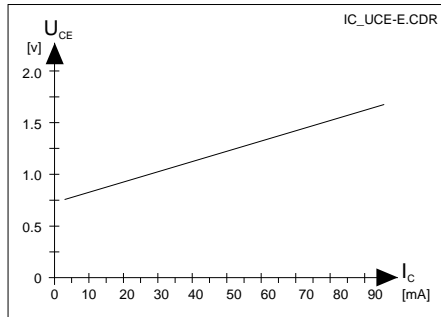


Electrical connection of CPM 152 in Ex area



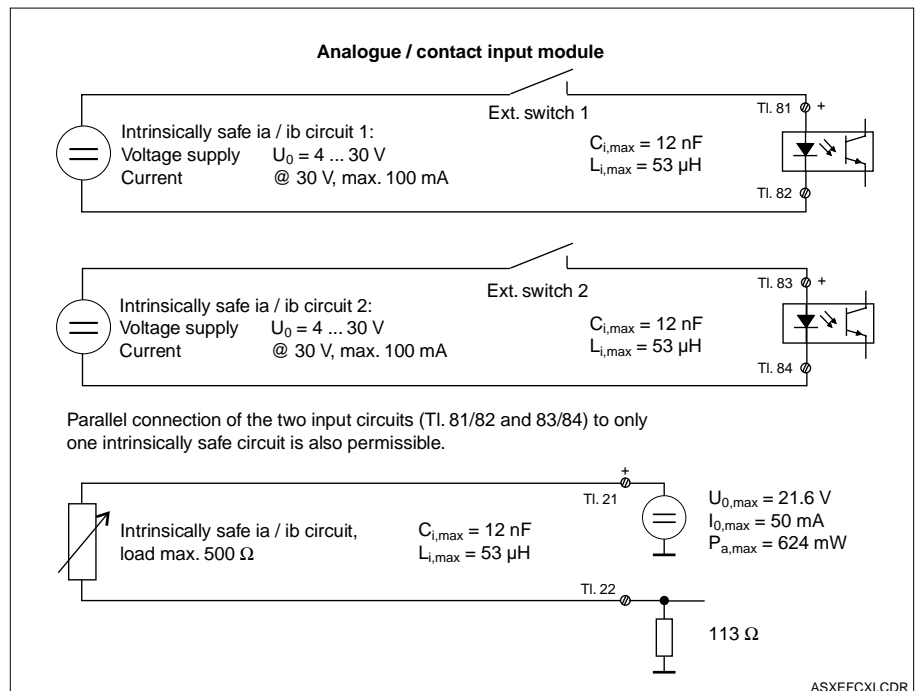
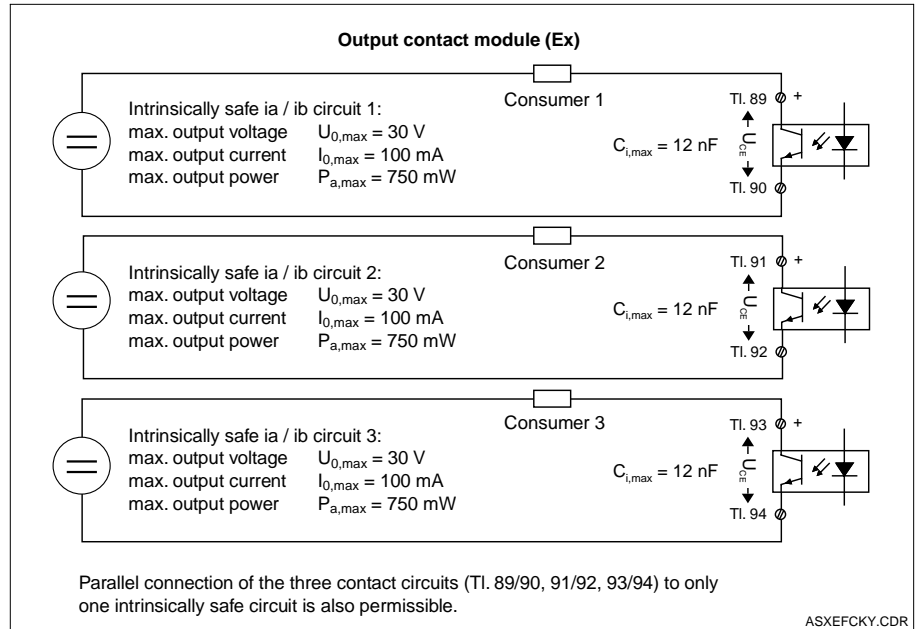
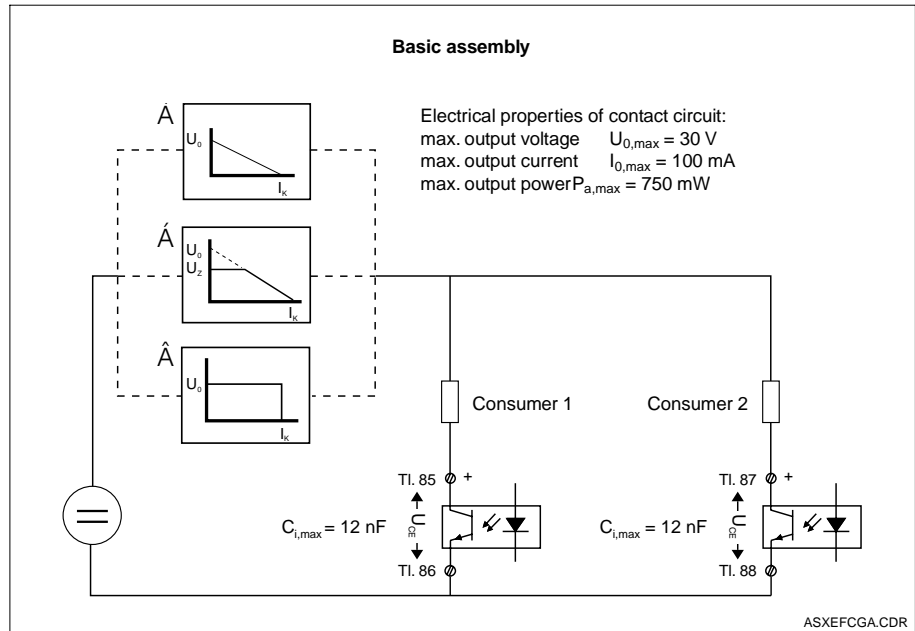
External wiring of output contacts on basic assembly:
only one intrinsically safe contact circuit (ia or ib) with a

- ① linear
 $P_a = \frac{1}{4} U_0 \cdot I_k$
 - ② trapezoidal
 - 1) $U_z > 0.5 U_0$:
 $P_a = \frac{1}{4} U_0 \cdot I_k$
 - 2) $U_z < 0.5 U_0$:
 $P_a = (U_0 - U_z) \cdot U_i / R_i$
 - ③ or rectangular
 $P_a = U_0 \cdot I_k$
- output characteristic



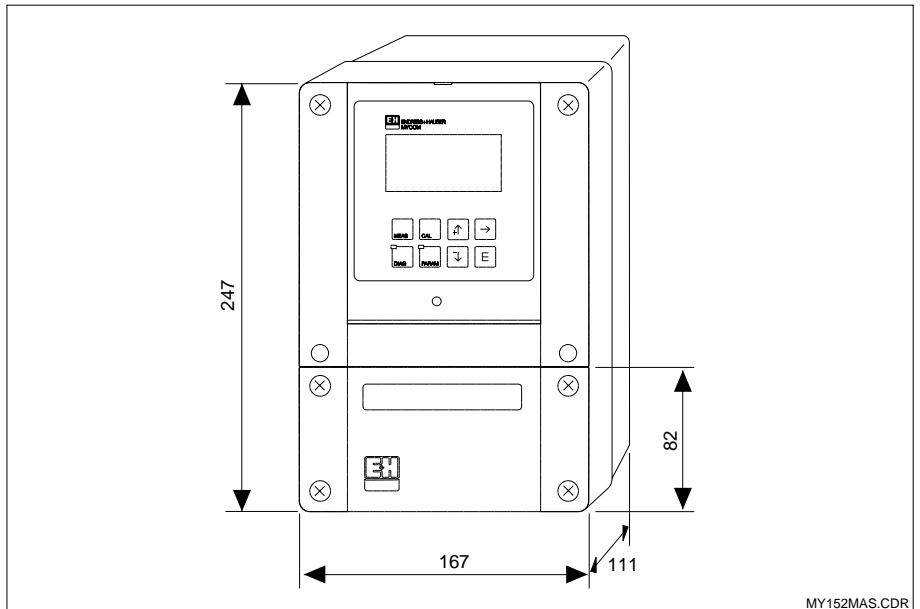
Characteristic of optocoupler switching transistors on basic assembly and output contact module

External wiring of output contacts on output contact module



External wiring of input circuits on analogue / contact input module

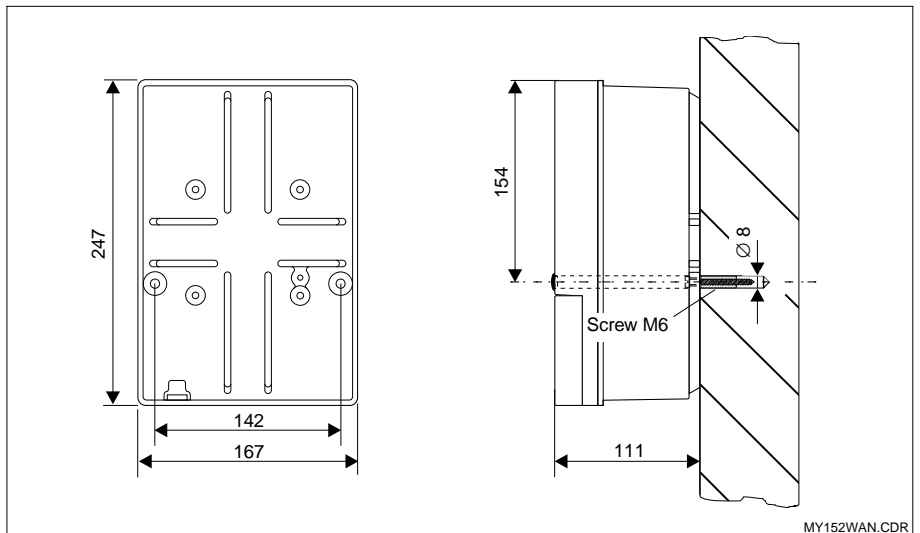
Dimensions



Dimensions of Mycom CPM 152

MY152MAS.CDR

Mounting

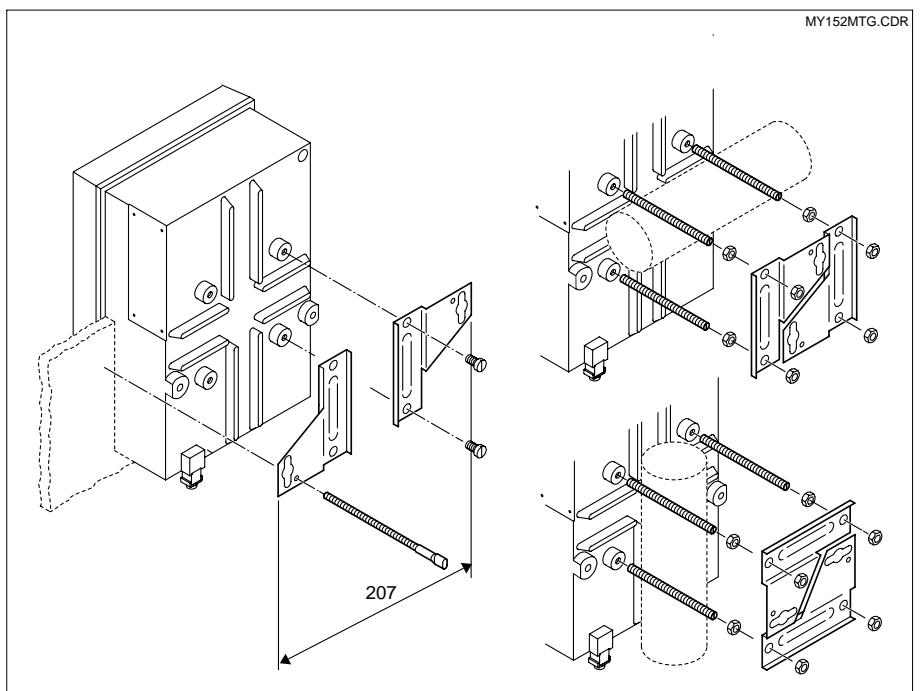


Wall mounting of Mycom CPM 152

MY152WAN.CDR

Panel or post mounting is possible using the mounting kit supplied with mounting version B.

Panel cutout: $161^{+0.5} \times 241^{+0.5}$ mm
 Mounting depth: approx. 134 mm
 Maximum pipe diameter: 70 mm



MY152MTG.CDR

Panel mounting (left) and post mounting (right)

Weather protection cover CYY 101 available as an accessory is recommended for outdoor installation.

Technical data

General specifications

Manufacturer	Endress+Hauser
Product designation	Mycom CPM 152

pH measurement

Measuring range	pH -2.00 ... +16.00
Measured value resolution	pH 0.01
Deviation of indication ¹ , measured value	max. 0.2 % of measuring range
Reproducibility ¹	max. 0.1 % of measuring range
Zero-point shift range	pH -2.00 ... +16.00
Automatic temperature compensation range	-20 ... +150 °C
Reference temperature	25 °C
Slope adjustment	5 ... 99 mV/pH
pH signal input	
Input resistance at nominal operating conditions	$> 1 \times 10^{12} \Omega$
Input current at nominal operating conditions	$< 1.6 \times 10^{-12} \text{ A}$
pH signal output	
Current range (active)	0 / 4 ... 20 mA
Measurement deviation ¹	max. 0.2 % of maximum current value
Load	max. 600 Ω (Ex: max. 500 Ω)
Transfer range	adjustable, Δ 1.8 ... Δ 18 pH

Technical data (continued)

Redox measurement

Measuring range	-1500 ... +1500 mV / -3000 ... + 3000 %
Measured value resolution	1 mV / 1 %
Deviation of indication ¹ , measured value	max. 0.2 % of measuring range
Reproducibility ¹	max. 0.1 % of measuring range
Assignment for % display	adjustable, Δ for 100 % = 150 ... 2000 mV
Electrode offset	±200 mV
Redox signal input	
Input resistance at nominal operating conditions	$> 1 \times 10^{12} \Omega$
Input current at nominal operating conditions	$< 1.6 \times 10^{-12} \text{ A}$
Redox signal output	
Current range (active)	0 / 4 ... 20 mA
Measurement deviation ¹	max. 0.2 % of maximum current value
Load	max. 600 Ω (Ex: max. 500 Ω)
Transfer range	adjustable, Δ 300 ... Δ 3000 mV

Technical data (continued)

Temperature measurement

Temperature sensor	Pt 100 (three-wire connection)
Measuring range (can also be displayed in °F and K)	-20 ... +150 °C
Measured value resolution	0.1 °C
Deviation of indication ¹ , measured value	max. 0.5 % of measuring range
Reproducibility ¹	max. 0.1 % of measuring range
Temperature signal output	
Current range (active)	0 / 4 ... 20 mA
Measurement deviation ¹	max. 0.2 % of maximum current value
Load	max. 600 Ω (Ex: max. 500 Ω)
Transfer range	adjustable, Δ 17 ... Δ 170 °C

Limit, controller and alarm functions

Function (adjustable)	limit contactor, pulse-length controller, pulse-frequency controller, three-point step controller
Controller response (adjustable)	P / PI / PID or PD / PDT1
Limit contactor / two-point controller	2 contact outputs, up to 3 optional outputs for cleaning functions
Function type	MIN or MAX
Set point range	pH -2.00 ... 16.00
Hysteresis for switching contacts	
pH	pH 0.1 ... 1.0
Redox absolute	10 ... 100 mV
Redox relative	1 ... 100 %
Pickup / dropout delay	0 ... 7200 s
Alarm threshold	
pH	pH 0.1 ... 18
Redox absolute	10 ... 3000 mV
Redox relative	1 ... 3000 %
Alarm delay	0 ... 6000 s

Technical data of PROFIBUS-PA

Output parameters

Output signal	digital communication signal, PROFIBUS-PA
PA function	slave
Response time Slave	approx. 20 ms
PLC	approx. 600 ms at approx. 30 instruments
Alarm signal	PROFIBUS-PA: signal status bit is set, last valid measured value is retained
Integration time	0 ... 99 s, default 0 s
Communication resistor	none, separate PROFIBUS-PA terminating resistor
Physical layer	IEC 1158-2
Integrated overvoltage protection	25 V AC / 250 A

Display and user interface

Remote control	via PC using operating program Commuwin II
Communication point	PROFIBUS-PA

Power supply

Supply voltage	9 ... 32 V DC
Current consumption	10 ± 1 mA
Inrush current	corresponds to Table 4, IEC 1158-2

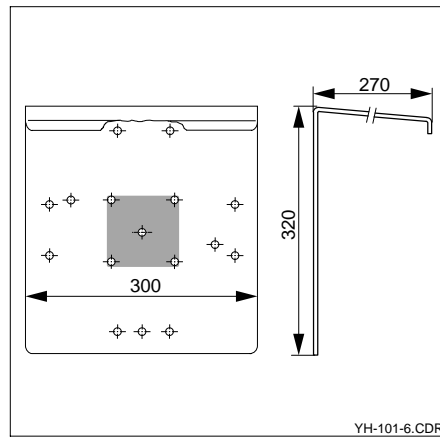
Subject to modifications.

Accessories

Weather protection cover CYY 101

Weather protection cover is for use in outdoor installation.

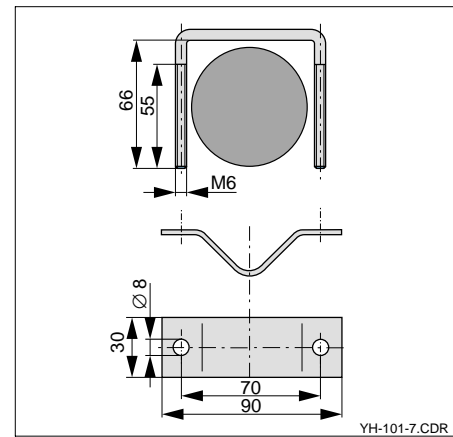
Order no. CYY101-A



Round post mount for CYY 101

For attachment of weather protection cover to vertical or horizontal tubing with a diameter of up to 70 mm.

Order no. 50062121



Product structure

pH and redox measuring transmitter Mycom CPM 152

Field housing for wall mounting, ingress protection IP 65, signal outputs 0 / 4 ... 20 mA for pH/redox and temperature, 2 output contacts, integrated electrode function monitoring

Equipment and certificate

1-circuit version for non-Ex areas

- A1A Basic version
- A1B 3 relays (Chemoclean)
- A1C Feedback/hold contact
- A1D 3 relays / feedback/hold contact (Autoclean)
- A1E PROFIBUS
- A1F 3 relays (Chemoclean), PROFIBUS
- A1G Feedback/hold contact, PROFIBUS
- A1H 3 relays / feedback/hold contact (Autoclean), PROFIBUS

2-circuit version for non-Ex areas

- A2A Basic version
- A2B 3 relays (Chemoclean)
- A2C Feedback/hold contact
- A2D 3 relays / feedback/hold contact (Autoclean)

1-circuit version for Ex areas (CENELEC)

- Z1A Basic version, EEx em [ia/ib] IIC T4
- Z1B 3 optocouplers (Chemoclean), EEx em [ia/ib] IIC T4
- Z1C Feedback/hold contact, EEx em [ia/ib] IIC T4
- Z1D 3 optocouplers / feedback/hold contact (Autoclean), EEx em [ia/ib] IIC T4
- Z1E PROFIBUS, EEx em [ia/ib] IIC T4
- Z1F 3 optocouplers (Chemoclean), PROFIBUS, EEx em [ia/ib] IIC T4
- Z1G Feedback/hold contact, PROFIBUS, EEx em [ia/ib] IIC T4
- Z1H 3 optocouplers / feedback/hold contact (Autoclean), PROFIBUS, EEx em [ia/ib] IIC T4

2-circuit version for Ex areas (CENELEC)

- Z2A Basic version, EEx em [ia/ib] IIC T4
- Z2B 3 optocouplers (Chemoclean), EEx em [ia/ib] IIC T4
- Z2C Feedback/hold contact, EEx em [ia/ib] IIC T4

1-circuit version for Ex areas (CSA)

- C1A Basic version, NI with IS outputs Cl. I-III Div. 2, Group A-G
- C1B 3 optocouplers (Chemoclean), NI with IS outputs Cl. I-III Div. 2, Group A-G
- C1D 3 optocouplers / feedback/hold contact (Autoclean), EEx em (ia/ib) IIC T4, NI with IS outputs Cl. I-III Div. 2, Group A-G
- C1H 3 optocouplers / feedback/hold contact (Autoclean), PROFIBUS, NI with IS outputs Cl. I-III Div. 2, Group A-G

2-circuit version for Ex areas (CSA)

- C2B 3 optocouplers (Chemoclean), NI with IS outputs Cl. I-III Div. 2, Group A-G

1-circuit version for Ex areas (FM)

- F1A Basic version, NI outputs Cl. I Div. 2, Cl. II/III Div. 1, Cl. I Zone 2
- F1B 3 optocouplers (Chemoclean), NI outputs Cl. I Div. 2, Cl. II/III Div. 1, Cl. I Zone 2
- F1D 3 optocouplers / feedback/hold contact (Autoclean), EEx em (ia/ib) IIC T4, NI outputs Cl. I Div. 2, Cl. II/III Div. 1, Cl. I Zone 2
- F1H 3 optocouplers / feedback/hold contact (Autoclean), PROFIBUS, NI outputs Cl. I Div. 2, Cl. II/III Div. 1, Cl. I Zone 2

2-circuit version for Ex areas (FM)

- F2B 3 optocouplers (Chemoclean), NI outputs Cl. I Div. 2, Cl. II/III Div. 1, Cl. I Zone 2

1-circuit version for Ex areas (FM AIS)

- G1A Basic version, AIS NI Cl. I-III Div. 1&2, Group A-G
- G1B 3 optocouplers (Chemoclean), AIS NI Cl. I-III Div. 1&2, Group A-G
- G1D 3 optocouplers / feedback/hold contact (Autoclean), EEx em (ia/ib) IIC T4, AIS NI Cl. I-III Div. 1&2, Group A-G
- G1H 3 optocouplers / feedback/hold contact (Autoclean), PROFIBUS, AIS NI Cl. I-III Div. 1&2, Group A-G

2-circuit version for Ex areas (FM AIS)

- G2B 3 optocouplers (Chemoclean), AIS NI Cl. I-III Div. 1&2, Group A-G

Power supply

- 0 230 V, 50 / 60 Hz
- 1 115 V, 50 / 60 Hz
- 2 200 V, 50 / 60 Hz
- 3 24 V, 50 / 60 Hz
- 5 100 V, 50 / 60 Hz
- 8 24 V, DC

Language version

- A D, E, F, I switchable
- C D, E, F, NL, J switchable

Equipment

- 10 Basic version
- 20 Moisture protection lacquering

Attachment

- A Without additional attachment
- B With post mounting kit

CPM 152- [] [] [] [] [] []

complete order code

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Endress+Hauser
The Power of Know How

